

We claim:

1. A method for processing one or more ordered sequences of PCM audio frames, comprising

5       appending to the beginning of frames, a segment of PCM audio that is substantially a replica of PCM audio in the end of the next preceding frame in an ordered sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence, whereby modified frames are produced,

10       maintaining for the modified frames a sequential order that is the same as the order of one of said one or more ordered sequences of the PCM audio frames or assigning a further sequential order to the modified frames, which sequential order is different from the order of one of said one or more ordered sequences of PCM audio frames, whereby the further sequential order has at least one discontinuity in its order with respect to the order of one of said one or more ordered sequences of PCM audio frames,

15       fading up the PCM audio appended to the beginning of the modified frame following a discontinuity and fading down the PCM audio in the end of the modified frame preceding a discontinuity when segments are appended to the beginning of frames or fading down the PCM audio appended to the end of the modified frame preceding a discontinuity and fading up the PCM audio in the beginning of the modified frame following a discontinuity when segments are appended to the end of frames,

20       overlapping and additively combining the faded-up and faded-down PCM audio preceding and following a discontinuity in the sequence of faded-up and faded-down modified frames, and

25       removing the segment of PCM audio appended to a modified frame in sequential pairs of modified frames and joining the resulting PCM audio frames when the sequential pair of modified frames does not contain a discontinuity following or preceding the appendage,

      whereby a further ordered sequence of PCM audio frames is provided having the same order as one of said one or more ordered sequences of PCM audio frames or having one or more discontinuities between sequences of PCM audio frames, each of said

30 sequences having the same order as one of said one or more ordered sequences of PCM audio frames or a portion thereof, discontinuities having an associated PCM audio crossfaded portion where said faded-up and faded-down PCM audio is overlapped and combined.

2. A method for processing one or more ordered sequences of PCM audio frames, comprising

appending only to the beginning of frames, a segment of PCM audio that is substantially a replica of PCM audio in the end of the next preceding frame in an ordered  
5 sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence, whereby modified frames are produced, and

transmitting, storing, or transmitting and storing the modified frames.

3. A method according to claim 2 further comprising time compressing the modified frames and wherein said transmitting, storing, or transmitting and storing transmits, stores, or transmits and stores time-compressed modified frames.

4. A method according to claim 2 further comprising time compressing and encoding the modified frames and wherein said transmitting, storing, or transmitting and storing transmits, stores, or transmits and stores time-compressed and encoded modified frames.

5. A method for processing PCM audio data, comprising  
receiving modified PCM audio frames, wherein the modified frames were produced by processing one or more ordered sequences of PCM audio frames by  
appending to the beginning of frames, a segment of PCM audio that is substantially a  
5 replica of PCM audio in the end of the next preceding frame in an ordered sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence,

maintaining for the modified frames a sequential order that is the same as the order of one of said one or more ordered sequences of the PCM audio frames or assigning  
10 a further sequential order to the modified frames, which sequential order is different from the order of one of said one or more ordered sequences of PCM audio frames, whereby the further sequential order has at least one discontinuity in its order with respect to the order of one of said one or more ordered sequences of PCM audio frames,

fading up the PCM audio appended to the beginning of the modified frame  
15 following a discontinuity and fading down the PCM audio in the end of the modified frame preceding a discontinuity when segments are appended to the beginning of frames or fading down the PCM audio appended to the end of the modified frame preceding a discontinuity and fading up the PCM audio in the beginning of the modified frame following a discontinuity when segments are appended to the end of frames,

20 overlapping and additively combining the faded-up and faded-down PCM audio preceding and following a discontinuity in the sequence of faded-up and faded-down modified frames, and

removing the segment of PCM audio appended to a modified frame in sequential pairs of modified frames and joining the resulting PCM audio frames when the sequential  
25 pair of modified frames does not contain a discontinuity following or preceding the appendage,

whereby a further ordered sequence of PCM audio frames is provided having the same order as one of said one or more ordered sequences of PCM audio frames or having one or more discontinuities between sequences of PCM audio frames, each of said  
30 sequences having the same order as one of said one or more ordered sequences of PCM audio frames or a portion thereof, discontinuities having an associated PCM audio crossfaded portion where said faded-up and faded-down PCM audio is overlapped and combined.

6. The method of claim 5 wherein the received modified PCM audio frames are time-compressed, the method further comprising time decompressing the received modified PCM audio frames.

7. The method of claim 5 wherein the received modified PCM audio frames are time-compressed and encoded, the method further comprising time decompressing and decoding the received modified PCM audio frames.

8. A method for processing PCM audio data, comprising  
receiving modified PCM audio frames, wherein the modified frames  
were produced by processing one or more ordered sequences of  
PCM audio frames by appending to the beginning of frames, a segment of  
PCM audio that is substantially a replica of PCM audio in the end of the  
next preceding frame in an ordered sequence, or, to the end of frames, a  
segment of PCM audio that is substantially a replica of PCM audio in the  
beginning of the next following frame in an ordered sequence, and  
have a sequential order that is the same as the order of one of said  
one or more ordered sequences of the PCM audio frames or have a further  
sequential order, which sequential order is different from the order of one  
of said one or more ordered sequences of PCM audio frames, whereby the  
further sequential order has at least one discontinuity in its order with  
respect to the order of one of said one or more ordered sequences of PCM  
audio frames,

fading up the PCM audio appended to the beginning of the modified frame  
following a discontinuity and fading down the PCM audio in the end of the modified  
frame preceding a discontinuity when segments are appended to the beginning of frames  
or fading down the PCM audio appended to the end of the modified frame preceding a  
discontinuity and fading up the PCM audio in the beginning of the modified frame  
following a discontinuity when segments are appended to the end of frames,

overlapping and additively combining the faded-up and faded-down PCM audio  
preceding and following a discontinuity in the sequence of faded-up and faded-down  
modified frames, and

removing the segment of PCM audio appended to a modified frame in sequential  
pairs of modified frames and joining the resulting PCM audio frames when the sequential

pair of modified frames does not contain a discontinuity following or preceding the appendage,

30       whereby a further ordered sequence of PCM audio frames is provided having the same order as one of said one or more ordered sequences of PCM audio frames or having one or more discontinuities between sequences of PCM audio frames, each of said sequences having the same order as one of said one or more ordered sequences of PCM audio frames or a portion thereof, discontinuities having an associated PCM audio crossfaded portion where said faded-up and faded-down PCM audio is overlapped and  
35       combined.

9. The method of claim 8 wherein the received modified PCM audio frames are time-compressed, the method further comprising time decompressing the received modified PCM audio frames.

10. The method of claim 8 wherein the received modified PCM audio frames are time-compressed and encoded, the method further comprising time decompressing and decoding the received modified PCM audio frames.

11. The method of claim 8 further comprising  
maintaining for the modified frames a sequential order that is the same as their order as received, whereby the modified frames may have a sequential order that has at least one discontinuity in its order with respect to the order of one of said one or more  
5       ordered sequences of PCM audio frames, or assigning a further sequential order to the modified frames, which sequential order is different from their order as received, whereby the further sequential order has at least one discontinuity in its order with respect to the order of one of said one or more ordered sequences of PCM audio frames.

12. A method for processing one or more ordered sequences of PCM audio frames, comprising

appending to the beginning of frames, a segment of PCM audio that is substantially a replica of PCM audio in the end of the next preceding frame in an ordered

5 sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence, whereby modified frames are produced,

fading up the PCM audio appended to the beginning of modified frames and fading down the PCM audio in the end of modified frames when segments are appended  
10 to the beginning of frames or fading down the PCM audio appended to the end of modified frames and fading up the PCM audio in the beginning of modified frames when segments are appended to the end of frames,

maintaining for the modified frames or for the faded-up and faded-down modified frames a sequential order that is the same as the order of one of said one or more ordered  
15 sequences of the PCM audio frames or assigning a further sequential order to the modified frames or to the faded-up and faded-down modified frames, which sequence is different from the order of one of said one or more ordered sequences of PCM audio frames, whereby the further sequential order has at least one discontinuity in its order with respect to the order of one of said one or more ordered sequences of PCM audio  
20 frames, and

overlapping and additively combining sequential pairs of faded-up and faded-down PCM audio in the sequence of faded-up and faded-down modified frames having a sequential order that is the same as the order of one of said one or more ordered  
sequences of the PCM audio frames or having said further sequential order,

25 whereby a further ordered sequence of PCM audio frames is provided having the same order as one of said one or more ordered sequences of PCM audio frames or having one or more discontinuities between sequences of PCM audio frames, each of said sequences having the same order as one of said one or more ordered sequences of PCM audio frames or a portion thereof, consecutive pairs in the further order of PCM audio  
30 frames having an associated PCM audio crossfaded portion where said faded-up and faded-down PCM audio is overlapped and combined.

13. A method for processing one or more ordered sequences of PCM audio frames, comprising

appending only to the beginning of frames, a segment of PCM audio that is substantially a replica of PCM audio in the end of the next preceding frame in an ordered sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence, whereby modified frames are produced,

fading up the PCM audio appended to the beginning of modified frames and fading down the PCM audio in the end of modified frames when segments are appended to the beginning of frames or fading down the PCM audio appended to the end of modified frames and fading up the PCM audio in the beginning of modified frames when segments are appended to the end of frames, and

transmitting, storing, or transmitting and storing the faded-up and faded-down modified frames.

14. A method according to claim 13 further comprising time compressing the faded-up and faded-down modified frames and wherein said transmitting, storing, or transmitting and storing transmits, stores, or transmits and stores time-compressed faded-up and faded-down modified frames.

15. A method according to claim 13 further comprising time compressing and encoding the faded-up and faded-down modified frames and wherein said transmitting, storing, or transmitting and storing transmits, stores, or transmits and stores time-compressed, encoded, faded-up and faded-down modified frames.

16. A method according to claim 8 wherein the fade-up and faded-down modified frames were produced by processing that multiplies a portion of PCM audio by a fading function and subtracts the portion of PCM audio resulting from the multiplication from another portion of PCM audio.

17. A method for processing PCM audio, comprising  
receiving faded-up and faded-down modified PCM audio frames, wherein the  
faded-up and faded-down modified frames were produced by processing one or more  
ordered sequences of PCM audio frames by

5                   appending to the beginning of frames, a segment of PCM audio  
that is substantially a replica of PCM audio in the end of the next  
preceding frame in an ordered sequence, or, to the end of frames, a  
segment of PCM audio that is substantially a replica of PCM audio in the  
beginning of the next following frame in an ordered sequence, and  
10                   fading up the PCM audio appended to the beginning of modified  
frames and fading down the PCM audio in the end of modified frames  
when segments are appended to the beginning of frames or fading down  
the PCM audio appended to the end of modified frames and fading up the  
PCM audio in the beginning of modified frames when segments are  
15                   appended to the end of frames,  
maintaining for the faded-up and faded-down modified frames a sequential order  
that is the same as the order of one of said one or more ordered sequences of the PCM  
audio frames or assigning a further sequential order to the faded-up and faded-down  
modified frames, which sequence is different from the order of one of said one or more  
20                   ordered sequences of PCM audio frames, whereby the further sequential order has at least  
one discontinuity in its order with respect to the order of one of said one or more ordered  
sequences of PCM audio frames, and  
overlapping and additively combining sequential pairs of faded-up and faded-  
down PCM audio in the sequence of faded-up and faded-down modified frames,  
25                   whereby a further ordered sequence of PCM audio frames is provided in which  
consecutive pairs of PCM audio frames have a PCM audio crossfaded portion where said  
faded-up and faded-down PCM audio is overlapped and combined.

18. The method of claim 17 wherein the received faded-up and faded-down  
modified PCM audio frames are time-compressed, the method further comprising time  
decompressing the received modified PCM audio frames.



19. The method of claim 17 wherein the received faded-up and faded-down modified PCM audio frames are time-compressed and encoded, the method further comprising time decompressing and decoding the received modified PCM audio frames.

20. The method of claim 19 wherein the received faded-up and faded-down modified PCM audio frames are encoded with a lossless coding.

21. A method according to claim 17 or 20 wherein the fade-up and faded-down modified frames were produced by processing that multiplies a portion of PCM audio by a fading function and subtracts the portion of PCM audio resulting from the multiplication from another portion of PCM audio and wherein the further sequence of  
5 PCM audio frames have the same order as at least a portion of the received ordered sequence of PCM audio frames, whereby the further sequence of PCM audio frames constitutes a substantially identical reconstruction of said at least a portion of the received ordered sequence of PCM audio frames.

22. A method for processing PCM audio, comprising  
receiving faded-up and faded-down modified PCM audio frames, wherein the faded-up and faded-down modified frames were produced by processing one or more ordered sequences of PCM audio frames by

5                   appending to the beginning of frames, a segment of PCM audio that is substantially a replica of PCM audio in the end of the next preceding frame in an ordered sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence, and  
10                   fading up the PCM audio appended to the beginning of modified frames and fading down the PCM audio in the end of modified frames when segments are appended to the beginning of frames or fading down the PCM audio appended to the end of modified frames and fading up the

15 PCM audio in the beginning of modified frames when segments are  
appended to the end of frames,  
wherein the faded-up and faded-down modified PCM audio frames  
have a sequential order that is the same as the order of one of said one or  
more ordered sequences of the PCM audio frames or have a further  
sequential order, which sequential order is different from the order of one  
20 of said one or more ordered sequences of PCM audio frames, whereby the  
further sequential order has at least one discontinuity in its order with  
respect to the order of one of said one or more ordered sequences of PCM  
audio frames, and  
overlapping and additively combining sequential pairs of faded-up and faded-  
25 down PCM audio in the sequence of faded-up and faded-down modified frames,  
whereby a further ordered sequence of PCM audio frames is provided in which  
consecutive pairs of PCM audio frames have a PCM audio crossfaded portion where said  
faded-up and faded-down PCM audio is overlapped and combined.

23. The method of claim 22 wherein the received faded-up and faded-down  
modified PCM audio frames are time-compressed, the method further comprising time  
decompressing the received modified PCM audio frames.

24. The method of claim 22 wherein the received faded-up and faded-down  
modified PCM audio frames are time-compressed and encoded, the method further  
comprising time decompressing and decoding the received modified PCM audio frames.

25. The method of claim 24 wherein the received faded-up and faded-down  
modified PCM audio frames are encoded with a lossless coding.

26. A method according to claim 22 or 25 wherein the fade-up and faded-down  
modified frames were produced by processing that multiplies a portion of PCM audio by  
a fading function and subtracts the portion of PCM audio resulting from the  
multiplication from another portion of PCM audio and wherein the further sequence of

- 5 PCM audio frames have the same order as at least a portion of the received ordered sequence of PCM audio frames, whereby the further sequence of PCM audio frames constitutes a substantially identical reconstruction of said at least a portion of the received ordered sequence of PCM audio frames.

27. The method of claim 22 further comprising  
maintaining for the modified frames a sequential order that is the same as their order as received, whereby the modified frames may have a sequential order that has at least one discontinuity in its order with respect to the order of one of said one or more  
5 ordered sequences of PCM audio frames, or assigning a further sequential order to the modified frames, which sequential order is different from their order as received, whereby the further sequential order has at least one discontinuity in its order with respect to the order of one of said one or more ordered sequences of PCM audio frames.

28. A method for processing PCM audio, comprising  
receiving modified PCM audio frames, wherein the modified frames were produced by processing one or more ordered sequences of PCM audio frames by appending to the beginning of frames, a segment of PCM audio that is substantially a  
5 replica of PCM audio in the end of the next preceding frame in an ordered sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica of PCM audio in the beginning of the next following frame in an ordered sequence,

- fading up the PCM audio appended to the beginning of modified frames and fading down the PCM audio in the end of modified frames when segments are appended  
10 to the beginning of frames or fading down the PCM audio appended to the end of modified frames and fading up the PCM audio in the beginning of modified frames when segments are appended to the end of frames,

- maintaining for the modified frames or for the faded-up and faded-down modified frames a sequential order that is the same as the order of one of said one or more ordered  
15 sequences of the PCM audio frames or assigning a further sequential order to the modified frames or to the faded-up and faded-down modified frames, which sequence is different from the order of one of said one or more ordered sequences of PCM audio

frames, whereby the further sequential order has at least one discontinuity in its order with respect to the order of one of said one or more ordered sequences of PCM audio frames, and

overlapping and additively combining sequential pairs of faded-up and faded-down PCM audio in the sequence of faded-up and faded-down modified frames, having a sequential order that is the same as the order of one of said one or more ordered sequences of the PCM audio frames or having said further sequential order,

whereby a further ordered sequence of PCM audio frames is provided in which consecutive pairs of PCM audio frames have a PCM audio crossfaded portion where said faded-up and faded-down PCM audio is overlapped and combined.

29. The method of claim 28 wherein the received modified PCM audio frames are time-compressed, the method further comprising time decompressing the received modified PCM audio frames.

30. The method of claim 28 wherein the received modified PCM audio frames are time-compressed and encoded, the method further comprising time decompressing and decoding the received modified PCM audio frames.

31. The method of claim 30 wherein the received modified PCM audio frames are encoded with a lossless coding.

32. A method according to claim 28 or 31 wherein wherein fading up and fading down includes multiplying a portion of PCM audio by a fading function and subtracting the portion of PCM audio resulting from the multiplication from another portion of PCM and wherein the further sequence of PCM audio frames have the same order as at least a portion of the received ordered sequence of PCM audio frames, whereby the further sequence of PCM audio frames constitutes a substantially identical reconstruction of said at least a portion of the received ordered sequence of PCM audio frames.

33. A method for processing PCM audio, comprising  
receiving modified PCM audio frames, wherein the modified frames  
were produced by processing one or more ordered sequences of PCM audio  
frames by appending to the beginning of frames, a segment of PCM audio that is  
5 substantially a replica of PCM audio in the end of the next preceding frame in an ordered  
sequence, or, to the end of frames, a segment of PCM audio that is substantially a replica  
of PCM audio in the beginning of the next following frame in an ordered sequence, and  
have a sequential order that is the same as the order of one of said one or more  
ordered sequences of the PCM audio frames or have a further sequential order, which  
10 sequential order is different from the order of one of said one or more ordered sequences  
of PCM audio frames, whereby the further sequential order has at least one discontinuity  
in its order with respect to the order of one of said one or more ordered sequences of  
PCM audio frames,  
fading up the PCM audio appended to the beginning of modified frames and  
15 fading down the PCM audio in the end of modified frames when segments are appended  
to the beginning of frames or fading down the PCM audio appended to the end of  
modified frames and fading up the PCM audio in the beginning of modified frames when  
segments are appended to the end of frames, and  
overlapping and additively combining sequential pairs of faded-up and faded-  
20 down PCM audio in the sequence of faded-up and faded-down modified frames,  
whereby a further ordered sequence of PCM audio frames is provided in which  
consecutive pairs of PCM audio frames have a PCM audio crossfaded portion where said  
faded-up and faded-down PCM audio is overlapped and combined.

34. The method of claim 33 wherein the received faded-up and faded-down  
modified PCM audio frames are time-compressed, the method further comprising time  
decompressing the received modified PCM audio frames.

35. The method of claim 33 wherein the received faded-up and faded-down  
modified PCM audio frames are time-compressed and encoded, the method further  
comprising time decompressing and decoding the received modified PCM audio frames.

36. The method of claim 33 further comprising  
maintaining for the modified frames a sequential order that is the same as their  
order as received, whereby the modified frames may have a sequential order that has at  
5 least one discontinuity in its order with respect to the order of one of said one or more  
ordered sequences of PCM audio frames, or assigning a further sequential order to the  
modified frames, which sequential order is different from their order as received,  
whereby the further sequential order has at least one discontinuity in its order with  
respect to the order of one of said one or more ordered sequences of PCM audio frames.